

Redefining Measurement

ID 3000 Series – Picosecond Lasers

Compact, easy to use and versatile sources of telecom-band, NIR, visible and UV photons

The ID 3000 Series is a cost-effective solution offering high-quality picosecond-pulsed laser light under long-term and maintenance-free operation. Both free space and fibre-coupled versions are available to handle virtually any optical application.

An ID 3000 Series laser can be used with IDQ single-photon detectors and Time Controller Series to enrich a range of high-speed and high-sensitivity time-correlated single-photon counting (TCSPC) applications, from quantum photonics and quantum information, super-resolution microscopy, time-resolved spectroscopy, to the field-testing of optical fibres.



Use the ID 3000 Series Picosecond Laser to enhance your experiments today.

Key Features & Benefits

- ▶ Optical pulses typically shorter than 30 ps (at least < 50 ps)
- ▶ Continuously tuneable repetition rate, from pulse-on-demand up to 40 MHz
- ▶ Ultra-low timing jitter < 4 ps rms
- ▶ Remote operation available via RS-232 or USB 2.0 connection
- ▶ Maintenance-free 24/7 operation
- ▶ Free space or fibre-coupled laser emission
- ▶ In-stock models: 1550 nm and 1310 nm sources
- ▶ Available wavelengths: 375 nm to 1550 nm

New

- ▶ Even shorter laser pulses, on demand
- ▶ Available in a range of wavelengths, from UV to the telecom C-band

Applications

- ▶ QKD and quantum communication
- ▶ Quantum computing and quantum optics
- ▶ TCSPC, photoluminescence and spectroscopy
- ▶ Fluorescence Lifetime IMaging (FLIM)
- ▶ Single-photon detector characterization
- ▶ Optical Time Domain Reflectometry (OTDR)
- ▶ Light Detection And Ranging (LIDAR)

Picosecond pulses on demand

The ID 3000 Series of compact, versatile and easy-to-use picosecond-pulsed lasers

These lasers are based on high-reliability semiconductor laser diodes operated in gain-switched mode, emitting laser pulses typically shorter than 30 ps across a broad segment of the electromagnetic spectrum (UV to telecom C-band, 375 nm to 1550 nm).

Each ID 3000 laser source operates as a laser head working in tandem with a laser controller, where multiple laser heads can be interchanged with a single controller. The laser head is pre-tuned to a particular wavelength (see Table 1), and can be operated out-of-the-box within minutes through the controller’s user-friendly interface.

The on-demand picosecond pulses of the laser head — combined with the ultra-low timing jitter of the ID 3000’s laser controller — allow for unparalleled precision and control in your experimental setup within such a compact device.

VERSATILE DESIGN

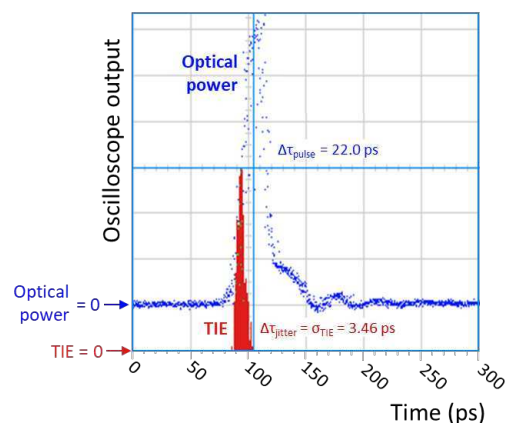
- ▶ Pulse-on-demand operation up to 40 MHz
- ▶ Remote operation: you can control via RS-232 or USB 2.0 connection
- ▶ Robust design: functions maintenance-free under 24/7 industrial operation

ULTRAFAST LASER PULSES

The gain-switched operation of the semiconductor laser diode allows emission of ultrafast optical pulses from 20 to 110 ps pulse width with ultra-low timing jitter.

ULTRA-LOW JITTER

- ▶ The ID 3000’s timing jitter is ultra-low: typically lower than 4 ps
- ▶ This ultra-low measured jitter is only an upper limit of the timing jitter, as it includes jitter contributions from the measuring electronics
- ▶ Pulse-tuning mode minimizes the effects of after-pulsing



Optical pulse profile and timing interval error (TIE) from a 1550nm ID 3000 laser. Pulse width $\Delta\tau_{pulse}$ is calculated as the FWHM of the optical pulse profile. Timing jitter $\Delta\tau_{jitter}$ is calculated as the standard deviation of fluctuations in the detected optical pulse arrival time (the TIE), at 50% amplitude of the pulse’s leading edge.

Picosecond pulses on demand

The ID 3000 Series of compact, versatile and easy-to-use picosecond-pulsed lasers

LASER SPECIFICATIONS

| Type | Output | Wavelength | Spectral width | Pulse width | Peak power | Avg. power |
|------|------------|--------------|----------------|------------------------|------------|------------|
| DFB | FC/APC | 1550 ± 10 nm | < 0.5 nm | < 50 ps ^(a) | > 20 mW | > 0.02 mW |
| DFB | Free space | 1550 ± 10 nm | < 0.5 nm | < 50 ps ^(a) | > 40 mW | > 0.04 mW |
| DFB | FC/APC | 1310 ± 10 nm | < 0.5 nm | < 50 ps ^(a) | > 20 mW | > 0.02 mW |
| DFB | Free space | 1310 ± 10 nm | < 0.5 nm | < 50 ps ^(a) | > 40 mW | > 0.04 mW |
| FP | Free space | 1060 ± 20 nm | < 10 nm | < 50 ps | > 200 mW | > 0.5 mW |
| FP | FC/APC | 940 ± 20 nm | < 10 nm | < 50 ps | > 80 mW | > 0.2 mW |
| FP | Free space | 940 ± 20 nm | < 10 nm | < 50 ps | > 200 mW | > 0.5 mW |
| FP | FC/APC | 850 ± 15 nm | < 7 nm | < 50 ps | > 80 mW | > 0.2 mW |
| FP | Free space | 850 ± 15 nm | < 7 nm | < 50 ps | > 200 mW | > 0.5 mW |
| FP | FC/APC | 690 ± 15 nm | < 7 nm | < 50 ps | > 80 mW | > 0.2 mW |
| FP | Free space | 690 ± 15 nm | < 7 nm | < 50 ps | > 200 mW | > 0.6 mW |
| FP | FC/APC | 665 ± 15 nm | < 7 nm | < 45 ps | > 80 mW | > 0.3 mW |
| FP | Free space | 665 ± 15 nm | < 7 nm | < 45 ps | > 200 mW | > 0.6 mW |
| FP | FC/APC | 635 ± 15 nm | < 7 nm | < 70 ps | > 80 mW | > 0.3 mW |
| FP | Free space | 635 ± 15 nm | < 7 nm | < 70 ps | > 200 mW | > 0.8 mW |
| FP | FC/APC | 510 ± 15 nm | < 10 nm | < 110 ps | > 40 mW | > 0.2 mW |
| FP | Free space | 510 ± 15 nm | < 10 nm | < 110 ps | > 100 mW | > 0.6 mW |
| FP | FC/APC | 480 ± 20 nm | < 10 nm | < 80 ps | > 60 mW | > 0.3 mW |
| FP | Free space | 480 ± 20 nm | < 10 nm | < 80 ps | > 150 mW | > 0.8 mW |
| FP | FC/APC | 440 ± 20 nm | < 5 nm | < 70 ps | > 100 mW | > 0.3 mW |
| FP | Free space | 440 ± 20 nm | < 5 nm | < 70 ps | > 250 mW | > 0.7 mW |
| FP | FC/APC | 405 ± 15 nm | < 5 nm | < 45 ps | > 160 mW | > 0.4 mW |
| FP | Free space | 405 ± 15 nm | < 5 nm | < 45 ps | > 400 mW | > 1.0 mW |
| FP | FC/APC | 375 ± 10 nm | < 5 nm | < 45 ps | > 160 mW | > 0.3 mW |
| FP | Free space | 375 ± 10 nm | < 5 nm | < 45 ps | > 400 mW | > 0.6 mW |

^(a) Pulse widths typically less than 30 ps

Table 1: The available models and options for the ID 3000 Series Picosecond Lasers. Note that all lasers have a maximum repetition rate of 40 MHz.

GENERAL SPECIFICATIONS

| Optical | |
|--------------------------------------|---------------------------------------|
| Pulse repetition rate ^(b) | Pulse-on-demand (0 Hz to 40 MHz) |
| Frequency resolution | 1 @ 50 Hz |
| Beam quality, TEM | $M^2 < 1.2$ |
| Polarization extinction ratio | > 20 dB (unpolarized fibre) |
| Timing jitter, rms | < 4 ps |
| Mechanical/Electrical/Environmental | |
| Laser output | Free-space or single-mode fibre |
| Output fibre length | 1 m FC/APC |
| Warm-up time | < 10 minutes |
| Operation temperature | 15 – 35 °C |
| Storage temperature | -15 – 60 °C |
| On/off cycles | > 10,000 |
| Lifetime | > 10,000 hours |
| Power supply requirements | 12 VDC/3A or 100-264 VAC, 47-63 Hz |
| Power consumption | < 30 W |
| Laser head dimensions (W x H x L) | 95 mm x 31 mm x 181 mm |
| Laser head weight | 0.45 kg |
| Control unit dimensions (W x H x L) | 326 mm x 88 mm x 235 mm |
| Control unit weight | 2.5 kg |
| Interface | |
| Trigger in ^(b) | TTL or ± 5 V @ 50 Ω (BNC) |
| Trigger in delay | Free space: < 50 ns Fibre: < 60 ns |
| Trigger out (synchronization) | + 5 V @ 50 Ω (BNC) |
| Interlock | 2.5 mm mono TS (jack connector) |
| External communication | USB 2.0 or RS-232 |

^(b) Pulse-on-demand with external trigger. Internal trigger >25 Hz

WARNING
CLASS 1 LASER PRODUCT
CLASSIFIED PER IEC 60825-1, ED 3.0, 2014

